<u>In the Claims</u>

This listing of claims will replace all prior versions and listings of claims in the application:

1   1.   (Currently Amended) A method of performing a Fast Fourier
2   Transform in a data processing apparatus having a data cache
3   smaller than the data set of the Fast Fourier Transform, comprising
4   the steps of:
5   <u>dividing</u> <u>said</u> <u>input</u> <u>data</u> <u>into</u> <u>R</u> <u>continuous</u> <u>data</u> <u>sets</u> <u>where</u>
6   <u>each</u> <u>of</u> <u>said</u> <u>R</u> <u>continuous</u> <u>data</u> <u>sets</u> <u>fit</u> <u>within</u> <u>the</u> <u>data</u> <u>cache;</u>
7   <u>disposing</u> <u>said</u> <u>input</u> <u>data</u> <u>into</u> <u>memory,</u> each R <u>continuous</u> <u>data</u>
8   <u>set</u> <u>in</u> <u>continuous</u> <u>memory</u> <u>locations</u> <u>with</u> <u>a</u> <u>space</u> <u>in</u> <u>memory</u> <u>locations</u>
9   <u>from</u> <u>an</u> <u>end</u> <u>of</u> <u>one</u> <u>continuous</u> <u>data</u> <u>set</u> <u>to</u> <u>a</u> <u>beginning</u> <u>of</u> <u>a</u> <u>next</u>
10 <u>continuous</u> <u>data</u> <u>set</u> <u>equal</u> <u>to</u> <u>the</u> <u>size</u> <u>of</u> <u>a</u> <u>cache</u> <u>line;</u>
11   <u>separately</u> <u>and</u> <u>independently</u> performing a first stage radix-R
12 butterfly computations on all the ~~input data~~ <u>the</u> <u>R</u> <u>continuous</u> <u>data</u>
13 <u>sets</u> <u>thereby</u> producing R independent intermediate data sets <u>each</u> <u>of</u>
14 <u>which</u> <u>fits</u> <u>within</u> <u>the</u> <u>data</u> <u>cache;</u> <u>and</u>
15   successively performing second and all subsequent stage
16 butterfly computations on each independent intermediate data set in
17 turn producing corresponding output data.

      2.   (Canceled)

1   3.   (Original) The method of claim 1, wherein:
2   said radix-R is radix-2.

1   4.   (Original) The method of claim 1, wherein:
2   said radix-R is radix-4.

      5.   (Canceled)

1   6.   (Currently Amended) The method of performing an N-point
2   radix-R Fast Fourier Transform in a data processing apparatus
3   having a data cache comprising the steps of:
4   comparing the data set of input data and twiddle factors with
5   the size of the data cache;
6   if said data set is smaller than said data cache, performing
7   said Fast Fourier Transform in $\log_R N$ stages on all the data set in
8   one pass; and
9   if said data set is larger than said data cache but smaller
10   than R times the data cache
11   dividing said input data into R continuous data sets
12   where each of said R continuous data sets fit within the data
13   cache;
14   disposing said input data into memory, each R continuous
15   data set in continuous memory locations with a space in memory
16   locations from an end of one continuous data set to a
17   beginning of a next continuous data set equal to the size of a
18   cache line;
19   separately and independently performing a first stage
20   radix-R butterfly computations on all the ~~input data~~ the R
21   continuous data sets thereby producing R independent
22   intermediate data sets in a first pass each of which fits
23   within the data cache; and
24   successively performing second and all subsequent stage
25   butterfly computations on each independent intermediate data
26   set in turn producing corresponding output data in second
27   passes.

1   7.   (Original) The method of claim 6, wherein:
2   said Fast Fourier Transform uses complex input data and
3   complex twiddle factors of M bytes each; and

4   said step of comparing the data set with the size of the data

5   cache compares the data cache size to 4 N M bytes.

1   8.   (Original) The method of claim 6, wherein:

2   said radix-R is radix-2.

1   9.   (Original) The method of claim 6, wherein:

2   said radix-R is radix-4.

3   10.   (Canceled)

1   11.   (Original) The method of claim 6, further comprising:

2   if said data set is larger than R times the data cache

3   performing I initial stages of radix-R butterfly

4   computations on all the input data producing R independent

5   intermediate data sets, where I is the next integer greater

6   than $\log_R(D/C)$, D is the size of the data set and C is the

7   size of the cache; and

8   successively performing all subsequent stage butterfly

9   computations on each independent intermediate data set in turn

10   producing corresponding output data in second passes.